

Best Practice Guidance for Fluorinated Firefighting Foams

Q & A

Q What are fluorinated firefighting foams?

A Fluorinated firefighting foams are the most effective agents currently available to fight flammable liquid fires. These foams contain fluorosurfactants that provide fuel repellency, heat stability and the required low surface tension and positive spreading coefficient that enables formation of an aqueous film on the surface of hydrocarbon fuels. Fluorinated foams provide rapid extinguishment, burn-back resistance, and protection against vapor release, which help to prevent re-ignition and protect firefighters working in the area as part of rescue and recovery operations.

Types of fluorinated Class B firefighting foams:

- Aqueous film-forming foam (AFFF)
- Alcohol resistant aqueous film-forming foam (AR-AFFF)
- Film-forming fluoroprotein foam (FFFP)
- Alcohol resistant film-forming fluoroprotein foam (AR-FFFP)
- Fluoroprotein foam (FP)
- Alcohol resistant fluoroprotein foam (FPAR)

Q When should fluorinated firefighting foams be used?

A In order to minimize the environmental impact of fluorinated foams, their use should be limited to situations that present a significant flammable liquid hazard such as:

- Airport operations
- Storage tanks, terminals and petroleum/chemical processing
- Highway and rail transportation
- Marine and military applications
- Industrial facilities
- Some power generating facilities.

Q When should fluorinated firefighting foams not be used?

- A**
- Forest fires
 - Residential and structural fires
 - Computer rooms and telecommunications facilities
 - Restaurants and commercial kitchens
 - General facilities protection
 - Class A (wood) or Class C (electrical) hazards where there is minimal or no flammable liquid threat
 - Small flammable liquid threats such as automobile fires without a significant fuel spill where a large water application rate or dry chemical extinguisher can be used

Q How can discharges of fluorinated foams to the environment be minimized?

- A**
- Use training foams that do not contain fluorosurfactants for training purposes.
 - Use surrogate liquid test methods that do not contain fluorosurfactants for testing fixed system and vehicle foam proportioning systems.
 - Provide for containment, treatment, and proper disposal of foam solution—do not release directly to the environment.
 - Follow applicable industry standards for design, installation, maintenance, and testing of foam systems.
 - Minimize foam releases from foam systems as a result of accidental discharges by using approved detection/control systems and proper maintenance of the system.
 - Use foam, equipment and best practices that will safely and successfully handle the incident in the most efficient way.
 - Develop plans for dealing with unplanned releases of foam concentrate or foam solution so as to minimize the environmental impact.



Q How can emissions of foam and firewater be minimized during a live fire event?

A It is recommended that a firewater runoff collection plan be developed. This plan aims at listing and making available the required equipment (permanent or temporary) such as dikes, bunds, and holding tanks that will capture the runoff water and place this water in a contained area allowing later treatment. The goal of the plan is to minimize the volume of non-collected runoff firewater.

Q How should collected firewater be disposed?

A Runoff firewater is a complex fluid to handle after its collection. It potentially contains residual hydrocarbons or polar solvents from the burning fuel, combustion products, hydrocarbon surfactants, water-soluble polymers, hydrolyzed proteins, co-solvents, anti-freezing agents and fluorosurfactants. This type of runoff firewater can also potentially foam. Thermal destruction (high temperature incineration) at a facility capable of handling halogenated waste or the equivalent is a recognized way to dispose of this type of effluent. Other techniques that have proven effective in removing fluorosurfactants from firewater or foam runoff include a combination of coagulation, flocculation, electro-flocculation, reverse osmosis, and adsorption on granular activated carbon (GAC).

Q How should spent or expired foam concentrate be disposed?

A When disposal of a fluorinated foam concentrate is required (end of life), it is recommended that it be sent for thermal destruction (high temperature incineration) to a facility capable of handling halogenated waste or the equivalent.

Q What are manufacturers doing to address the environmental impact of fluorinated firefighting foams?

A Most foam manufacturers have reformulated their foam products to contain only short-chain (C6) fluorotelomer-based fluorosurfactants. These products are generally equivalent in performance to past foams, but are considered to be much lower in toxicity and not bioaccumulative based on current regulatory criteria. In addition, the foam industry is promoting best practices for the use and disposal of fluorinated firefighting foams with the goal of significantly reducing discharges to the environment. FFFC has developed a best practice guidance document that provided the information for this flyer and is available online at <http://www.ffc.org/images/bestpracticeguidance2.pdf>



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